



DEFRA / AHT / BEVA EQUINE QUARTERLY DISEASE SURVEILLANCE REPORT Volume 6, No.2: April – June 2010



Highlights in this issue:

- **EVA and EIA outbreaks in the UK**
- **Overview and new approaches to EVA control**
- **Contagious Equine Metritis (CEM) in non-Thoroughbreds in mainland Europe**

Important note:

The data presented in this report must be interpreted with caution, as there is likely to be some bias in the way that samples are submitted for laboratory testing. For example they are influenced by factors such as owner attitude or financial constraints or are being conducted for routine screening as well as clinical investigation purposes. Consequently these data do not necessarily reflect true disease frequency within the equine population of Great Britain.



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Introduction

Welcome to the second quarterly equine disease surveillance report for 2010 produced by Department of Environment, Food and Rural Affairs (Defra), British Equine Veterinary Association (BEVA) and the Animal Health Trust (AHT). Regular readers will be aware that this report collates equine disease data arising from multiple diagnostic laboratories and veterinary practices throughout the United Kingdom giving a unique insight into equine disease occurrence on a national scale.

National disease occurrence

Equine Infectious Anaemia (EIA)

On 7th September 2010 the Department for Environment, Food and Rural Affairs (Defra) has reported Equine Infectious Anaemia in a horse in Northumberland, England, following legal importation from the Netherlands on 15th August 2010. The infected horse arrived in a group of six horses originating in the Netherlands and was confirmed to be positive for EIA when tested as part of routine post-import testing. The other five horses in the group have all tested negative. The premises where the infected horse stands is currently under restriction and as of 7th September the positive horse has been humanely destroyed in line with existing regulations. In addition, the other horses in the premises (eleven in total) are currently subject to epidemiological investigation and EIA testing. For more information about this outbreak, [click here](#) and [here](#).

On 11th September 2010 Defra has also reported Equine Infectious Anaemia in a horse in Devon, England. The positive case is a 6 year-old gelding housed at a private farm and was reported by the private veterinarian due to clinical illness (pyrexia, ventral oedema) and severe anaemia. The horse was also found to be positive for piroplasmosis. The affected horse has been on the farm since summer 2008 when it was imported into the UK and only became ill very recently.

The premise is currently under restriction and the infected horse has been humanely destroyed in line with existing regulations. The other two horses on the premises are currently being tested for evidence of infection. The investigation into the origin of this case is ongoing. For more information about this outbreak, [click here](#) and [here](#).

Animal Health provides registered users with the latest news specific to exotic notifiable farm animal and/or equine disease outbreaks in Great Britain by means of **alerts** that can be sent to the users by a pre-recorded voice message, mobile text, fax and email. If you wish to subscribe to this service, please [click here](#).

Equine Viral Arteritis (EVA)

As of 2nd August 2010, Department for Environment, Food and Rural Affairs (Defra) has confirmed EVA in a Dutch 3 year-old stallion stabled in Staffordshire, England. The stallion was already under restriction following a positive EVA test carried out prior to entering a stud in Shropshire and has tested positive by virus isolation on semen; testing was carried out by the VLA (Veterinary Laboratories Agency).

The infected stallion has not covered any mares nor donated any semen in this country. The horse is currently under breeding restrictions and Animal Health (AH) has already started a full investigation in order to establish the likely origin of the infection, as well as any mares that may have been affected. The disease is being controlled in line with the industry agreed [Horserace Betting Levy Board \(HBLB\) Codes of Practice](#). For more information about this outbreak, [click here](#).



Regarding EVA vaccination, it should be noted that the current datasheet requirement for the only inactivated EVA vaccine used in Europe presently is for **6 monthly boosters** and NOT 12 monthly (annual) boosters as was previously the case for this vaccine. This has been the case since April 2005, when the vaccine was granted a full licence by the Veterinary Medicines Directorate. Non-compliance with this booster interval requirement may necessitate investigation of the viral shedding status of stallions by Defra under the Equine Viral Arteritis Order 1995 ([click here](#)).

Note: The positive cases of **EIA** and **EVA** reported in this Introduction belong to the **3rd Quarter 2010** (July to September 2010) and therefore are **not** reported in the Virology Disease Report of this issue.

Contagious Equine Metritis (CEM)

With regards to the outbreak of CEM reported on 5th March 2010 in a 5 year-old Arabian stallion stabled in Devon, the affected stallion has been treated and has subsequently tested negative, as have the 3 mares used in test matings. All testing and treatment was carried out as per the industry agreed UK Horserace Betting Levy Board (HBLB) Code of Practice. Restrictions were lifted on 26th April 2010. It has not been possible to determine the origin of the infection despite an extensive veterinary epidemiological inquiry; however, the stallion had been recently imported from mainland Europe. As of 17th August the event has been declared resolved ([click here](#)).

Regarding the outbreak of CEM reported on 23rd March 2010 in a 10 year-old Highland mare stabled in Durham, the affected mare has been treated and has subsequently tested negative as per the industry agreed UK Horserace Betting Levy Board (HBLB) Code of Practice. Restrictions were lifted on 21st May 2010. It has not been possible to determine the origin of the infection despite an extensive veterinary epidemiological inquiry that traced all movements of this mare from the stud of birth (where there was no clinical or documentary evidence of CEM infection). It was determined that the mare has not been used for breeding purposes at any time prior to the pre-breeding tests that disclosed the infection. As of 17th August 2010 the event has been declared resolved ([click here](#)).

These two outbreaks highlight the importance of adopting a zero-tolerance to CEMO and should encourage veterinary practitioners to comply with the pre-breeding recommendations resumed in the industry agreed UK HBLB Codes of Practice in **non-Thoroughbred breeds**; these recommendations have led to a **zero level of CEMO positivity** in the **Thoroughbred population** in the UK.

Equine Influenza (EI)

Equine influenza continues to be of importance within the United Kingdom. In this issue we report on several small outbreaks, mainly in unvaccinated horses.

These outbreaks have been reported by the new text alert service sponsored by Merial Animal Health, **Tell-Tail**. This service alerts practitioners to outbreaks of equine influenza in the UK by a text message to the practitioner's mobile phone. If you are an equine veterinary practitioner and would like to sign up for this scheme, please register [here](#). This service has also been offered to the members of the National Trainers Federation (NTF). If you would like to contact us regarding outbreaks of equine influenza virus or would like to sign up for our sentinel practice scheme, please send a message to: equiflunet@aht.org.uk or follow the link to www.equiflunet.org.uk for more information on equine influenza.



International disease occurrence

Contagious Equine Metritis (CEM)

In the US, the overall totals of carrier stallions and mares directly associated with the 2008/09 CEM event remains at 23 stallions and five mares. Of the 977 additional horses determined to have been potentially exposed to *T. equigenitalis*, 958 (98.1%) have been confirmed free of the bacterium. Twenty-two of the carrier stallions have successfully completed their treatment and subsequent testing protocol and are clear of *T. equigenitalis*. All five carrier mares have been effectively treated and are free of infection. Although not confirmed, the source of *T. equigenitalis* for the 2008/09 CEM event is suspected to have been a Warmblood stallion imported into the USA in 2000. ([click here](#)).

Also in the US and totally unrelated to the 2008/09 CEM event, in May 2010, an Arabian stallion was confirmed a carrier of *T. equigenitalis* in California. The stallion was identified in the course of routine testing prior to shipping his semen to Europe. The stallion had been imported into the USA in March 2010 from a country not known to have been affected with CEM. Accordingly, the stallion was not required to undergo a post-entry period of quarantine and testing for *T. equigenitalis*. An additional 22 horses, comprising five stallions and 17 mares, have been identified as potentially exposed to this stallion; these are located in 7 states. Interim test results have failed to turn up any further carrier animals.

Equine Viral Arteritis (EVA)

Regarding the outbreak of EVA reported on 7th May 2010 in Argentina, as of 11th August the event has been declared resolved ([click here](#)). With regards to the measures applied in this outbreak, Argentina's National Animal and Agriculture Health Board (SENASA) extended the application of the vaccine against EVA in horses of different breed, under strict controlled conditions supervised by this official organism. The new legislation allows stallions of any breed to be vaccinated with doses exceptionally imported, in order to have a preventive tool to control this disease during the next covering season. As for the origin of the disease, it is associated with the importation of infected semen from which the virus was isolated.

Equine Infectious Anaemia (EIA)

As previously reported, following the investigation launched on 20th January 2010 after the UK reported having confirmed the disease in two horses of a consignment from Romania via Belgium, **EIA** has been confirmed in seven single cases in Assebroek and Brugge (West Flanders), Warsage, Fumal, Charneux and La Reid (Liège), and Knesselaere (East Flanders). These seven outbreaks in Belgium are continuing as of 1st September 2010. All horses having been in contact with the horses from Romania are being traced, movement controls are applied in the farms and the animals are being tested for the disease. For more information about these outbreaks, [click here](#).

Regarding the previously reported outbreak of EIA in Bayern (Germany) on 14th April 2010, the event (which involved 15 susceptible horses and one case that was euthanased) was declared resolved as of 1st June 2010 ([click here](#)). However, five new outbreaks (four in Hessen and one in North Westphalia) have been reported on the first days of September. The four outbreaks in Hessen have involved 52 susceptible horses and 4 positive cases whereas the outbreak in North Westphalia has involved 20 susceptible horses and one positive case. The affected horses have been euthanased or are due to be euthanased in the following days. For more information about these outbreaks, [click here](#).



As reported last quarter, two outbreaks of Equine Infectious Anaemia were reported respectively in March 2010 in the provinces of Montcaret and Prignonrieux, France. Regarding the outbreak in Moncaret, the positive horse was euthanased on 12th March 2010 and the remaining 28 horses in the premises were isolated and screened monthly by the Agar Gel Immunodiffusion Assay (AGID); all of them were negative. Restrictions were lifted and the event was considered resolved as of 6th July 2010. Overall the management of this outbreak and of the equides with an epidemiological link led to place 58 equides under surveillance and to carry out 228 screenings. The outbreak in Prignonrieux (Dordogne) reported on 30th March 2010 is continuing and has involved 21 susceptible horses and 2 cases up to date. There have been two new EIA outbreaks reported in France: one in Lot et Garonne and one in Nord. The outbreak in Lot et Garonne was reported on 25th August and has involved one case of EIA in an 11 year-old French Trotter breeding mare. This new outbreak is epidemiologically related to the index outbreak confirmed on 3rd March 2010 in Dordogne since the affected mare was born and held for several years in a farm in Prignonrieux, Dordogne before being introduced to the premises in Lot et Garonne in July. The outbreak in Nord was reported on 3rd September and has involved three positive mares which had been imported from Romania and are isolated at the moment; they are due to be euthanased in the following days. None of the positive cases showed clinical signs and were tested as part of an epidemiological investigation involving horses imported from Romania. Both outbreaks are continuing at the moment, restrictions have been placed and an epidemiological investigation is ongoing. For more information about the EIA outbreaks in France, [click here](#) and [here](#).

Finally, on the 2nd July 2010 EIA was reported in a horse in Western Macedonia and Thrace, Greece. There are three susceptible horses in the premises and no information regarding the age, gender or breed of the affected horse have been reported. Investigations are ongoing. For more information about this outbreak, [click here](#).

Control measures – Imports

As of 1st July 2010 the UK and other EU Member States have amended their EIA control measures. It has been established in the new UK post-import rules that, during the high risk period for EIA (May to September), all known consignments of four or more horses from any other Member States (excluding those moved under the TPA) will be subjected to risk based checks for compliance purposes by the Animal Health Agency. In addition, all equidae found to have originated in or spent a significant period of time in Romania or Italy during the past 12 months will be placed under movement restriction pending receipt of negative blood tests for EIA. For more information about the protective measures adopted by the UK and EU, click [here](#) and [here](#).

As of 27th August 2010, the Imports Team at Defra has published the revised EU legislation of the imports of horses and semen from Egypt into the EU. At the Standing Committee on the Food Chain and Animal Health (SCOFCAH), on 14th July 2010 it was agreed that the temporary admission, the re-entry after temporary export and the import into the EU of registered horses and the import of semen from equides from Egypt should be suspended under [Commission Decision 2010/463/EU](#).

Equine Piroplasmiasis

Regarding the **Equine Piroplasmiasis (EP)** outbreaks in the US, extensive follow-up tracing and testing of horses for evidence of EP infection continues in a number of states



as a consequence of the finding of widespread *Theileria (Babesia) equi* infection on a large ranch in Southern Texas in 2009. Apart from the 292 positive horses originally detected on the index premises, trace-back positive horses from that ranch were identified in some 16 states including Texas. Interstate movement testing and voluntary testing for entry to racetracks has turned up an additional 28 *T. equi* seropositive horses in Texas unrelated to the index ranch, some imported from EP endemic countries whereas 19 were former Quarter Horse (QH) racehorses. Furthermore, 10 *T. equi* seropositive QH racehorses have been confirmed on a premises in Georgia, with extensive connections with Mexico. New Mexico has reported finding 19 *T. equi* QH racehorses and two *B. caballi* QH as part of a racetrack pre-entry testing program. A significant number of the seropositive horses (16) have been euthanized. Limited numbers of *T. equi* seropositive horses have also been detected in California, Florida, Colorado, Oklahoma, Ohio and Massachusetts, some with histories of having been imported from known EP endemic countries. [Click here](#) for more information about the EP situation in the US.

Vesicular Stomatitis

Regarding the outbreak of **vesicular stomatitis virus (VS)** reported on 27th May 2010 in Arizona (USA), ([click here](#)) the USDA Animal Plant Health Inspection Service (APHIS) and the Arizona Department of Agriculture conducted a comprehensive epidemiological investigation of the event. There are currently no vesicular stomatitis virus-positive premises in Arizona, or any other State. Individual premises quarantines were released 21 days after lesions of all infected animals on the premises had healed; the last vesicular stomatitis positive premises was released from quarantine on 2nd July 2010 when this event was declared resolved.

Glanders

Regarding the outbreak of Glanders in Bahrain, as reported by the OIE reference laboratory (CVRL), the situation as of September 2010 is currently the following: There have been 2 outbreaks reported, one of which was declared resolved as of 30th April. 124 equines have tested positive and 3 tested dubious by the Complement Fixation (CF) test. There have been no donkeys involved in this outbreak, but *Burkholderia mallei* was isolated from a dromedary after it showed glanderous clinical signs with severe nasal discharge; two further dromedaries have tested positive. Testing and culling policy continues.

As already reported last quarter, Glanders was confirmed in a horse in a university veterinary hospital in Brasilia, Brazil on 21st April 2010. Since the first serological result was obtained, the Official Veterinary Service began investigations and examined all animals having had any contact with the affected animal; all were negative and, up to date, no animal shows clinical signs of the disease. The outbreak is ongoing and the Official Veterinary Service conducts the health surveillance and investigations needed to identify the source or origin of the disease.

Hendra Virus

As reported last quarter, on 20th May 2010 a horse was confirmed to be positive for Hendra Virus in Queensland, Australia; subsequently it was euthanased. As reported by Queensland Health, there is no indication of infection in any of the people on the property where the horse was kept. Even though there was another horse living in the adjoining property, it was not believed to be under threat; as of 9th June 2010, this neighbouring horse has tested clear for the disease. The source of infection is still unknown; generally it is accepted that horses become infected by fruit bats, and there was a fruit bat colony in



the area. As of 25th June the premises where the horse was diagnosed of Hendra Virus has been given the all clear; subsequently quarantine and restrictions have been lifted. For more information about this outbreak, [click here](#).

Eastern Equine Encephalomyelitis (EEE)

As of 31st August 2010, the number of confirmed cases of EEE in the US continues to rise, with an increase of 19 new cases confirmed in equids in the past week. The highest number of equine cases recorded so far this year of the current national total of 151 cases has been in Florida (83). This is followed by 26 cases in Michigan, 18 in Mississippi, 7 in Georgia, 6 in Alabama, 4 in Massachusetts and 1 or 2 cases in each of New Hampshire, New York, North Carolina, South Carolina, Texas and Virginia (where the only affected horse received an initial vaccination and a booster for EEE in the fall of 2009, as well as a booster in May of 2010).

West Nile Virus (WNV)

On 17th August 2010 16 outbreaks of WNV were reported in the Centre region of Morocco. Since then, 7 other outbreaks have been reported in the Centre and North-West regions involving a total of 173 susceptible horses and 24 cases (8 of them dead). All the outbreaks (23) are continuing as of 1st September 2010. For more information, [click here](#).

As of 27th August 2010 WNV has been reported for the first time in Greece ([click here](#) for more information). There are five outbreaks ongoing at the moment in Central Macedonia involving 18 susceptible equidae and 6 cases in total; no deaths have been reported up to date. Movement restrictions inside the country have been placed and the affected animals are receiving supportive treatment. It is worth mentioning that between early July and 22nd August 2010, 81 cases of West Nile neuroinvasive disease in humans were reported in the region of Central Macedonia, northern Greece. For more information about human cases of WNV in Greece, [click here](#).

On 7th September 2010 WNV has also been reported in Sicilia, Italy. There are four outbreaks ongoing at the moment, involving eight susceptible horses, four clinical cases and a destroyed horse. The source of infection is still unknown, investigations are ongoing. For more information, [click here](#).

Finally, on 10th September 2010 the OIE has reported the first occurrence of West Nile Virus (WNV) in equids in Spain. Two outbreaks involving two single cases and a total of seven susceptible horses have been reported in Cadiz, Andalusia. Restrictions have been placed and the affected animals are receiving supportive treatment. Investigations are ongoing.

Focus articles

In this report we are pleased to include two focus articles. Following the outbreak of Equine Viral Arteritis (EVA) in the UK, in our first focus article Richard Newton and Fatima Cruz from the AHT give an overview on the current and future approaches to EVA control.

In our second focus article Dr. Hanspeter Meier from the Vetsuisse Faculty, University of Berne, Switzerland has prepared a review on Contagious Equine Metritis (CEM) in non-Thoroughbreds in mainland Europe.



We reiterate that the views expressed in these focus articles are the authors' own and should not be interpreted as official statements of Defra, BEVA or the AHT.

Access to all of the equine disease surveillance reports can be made on a dedicated page on the Animal Health Trust website at http://www.aht.org.uk/equine_disease.html or via the BEVA and Defra websites:

<http://www.beva.org.uk/>

<http://www.defra.gov.uk/foodfarm/farmanimal/diseases/vetsurveillance/reports/listing.htm>

We would remind readers and their colleagues that a form is available on the AHT website for registration to receive reports free of charge, via e-mail, on a quarterly basis. The link for this registration form is available via

http://www.aht.org.uk/equine_disease_registration.html.



Virology Disease Report for the Second Quarter of 2010

The results of virological testing for April to June 2010 are summarised in Table 1 and include data relating to Equine Viral Arteritis (EVA), Equine Infectious Anaemia (EIA) and West Nile Virus (WNV) from the Veterinary Laboratories Agency (VLA), Weybridge. The sample population for the VLA is different from that for the other contributing laboratories, as the VLA's tests are principally in relation to international trade (EVA and EIA). VLA now provides testing for WNV as part of clinical work up of neurological cases on specific request and provided the local DVM has been informed.

Table 1: Diagnostic virology sample throughput and positive results for the second quarter 2010

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
<u>Serological Tests</u>			
EVA ELISA	2441	62 [#]	4
EVA VN	1196	34 [#]	3
VLA EVA VN	352	21 [#]	1
EHV-1/-4 CF test	469	12 [*]	1
EHV-3 VN test	13	1	1
ERV-A/B CF test	184	4 [*]	1
Influenza HI test	217	11 [*]	1
EIA (Coggins)	790	0	3
EIA ELISA	925	0	3
VLA EIA (Coggins)	617	9	1
VLA WNV (PRNT)	0	0	1
<u>Virus Detection</u>			
EHV-1/-4 PCR	124	16	2
EHV-2/-5 PCR	8	5	1
Influenza NP ELISA**	149	10	1
Influenza Directigen	37	0	1
Influenza VI in eggs	0	0	1
EHV VI	128	22	1
EVA VI/PCR	3	0	1
VLA EVA VI/PCR	28	0	1
Rotavirus	156	70	8

ELISA = enzyme-linked immunosorbent assay, VN = virus neutralisation, VLA = Veterinary Laboratories Agency, CF = complement fixation, HI = haemagglutination inhibition, Coggins = agar gel immuno diffusion test, PCR = polymerase chain reaction, NP = nucleoprotein, VI = virus isolation, EVA = equine viral arteritis, EHV = equine herpes virus, ERV = equine rhinitis virus, EIA = equine infectious anaemia
= Seropositives include vaccinated stallions, * = Diagnosed positive on basis of seroconversion between paired sera
** = The relatively high number of NP ELISA tests performed is largely due to requirements for international equine movement. All horses travelling to Australia must now have 2 NP ELISA tests performed prior to travel. The figures above include tests performed for international trade purposes.



Of the 21 EVA VN positives detected by the VLA, 9 were samples for private testing, 5 were serum samples from stallions for artificial insemination (AI) certification, 3 were export samples, 2 samples were submitted for diagnosis and 2 samples were from imported horses. The 28 semen samples received for EVA testing were all negative on virus isolation and RT-PCR.

The 617 agar gel immuno diffusion tests for EIA (AGID; Coggins) were conducted for international trade purposes. Two samples were positive and seven samples were weak positives (all nine positives were samples tested for international trade purposes).

Virological Diagnoses for the Second Quarter of 2010

Equine Infectious Anaemia (EIA)

As previously reported, the outbreak of EIA that started on 19th January 2010 in the UK involved two positive horses in Wiltshire (England), following importation from Belgium having previously originated from Romania. As of 30th April 2010 all remaining horses on the infected premises were tested with negative results, and no further cases were reported. The OIE declared this event resolved.

EHV-1 Abortion

An outbreak of EHV-1 causing two abortions and a neonatal death was reported on 6th April in a Thoroughbred Stud. EHV-1 was confirmed by PCR and virus isolation on placenta and fetal tissues in two aborted fetuses and a dead newborn foal. Restrictions were put in place in accordance with the recommendations of the HBLB Codes of Practice and serological screening of the whole population in the stud by means of paired serology showed no evidence of viral activity within the in-contacts. There were no further cases reported and restrictions were lifted a month after the first incident.

Seven single cases of EHV-1 abortions have been reported in this quarter. Two of these mares were Thoroughbred whereas one mare was a Warmblood and another mare was a Lusitano. The breed wasn't disclosed for the rest of the cases. EHV-1 was diagnosed by PCR and Virus Isolation in placenta and/or fetal tissues.

EHV-1 Paralytic disease

In a private yard with two horses, a horse with ataxia showed a seroconversion to EHV-1; however EHV-1 could not be isolated from a nasopharyngeal swab in either the affected horse or the in-contact. The in-contact, which did not show any clinical signs, showed stable low titres when tested by serology.

EHV-1 was isolated from a nasopharyngeal swab in a horse showing hindlimb and forelimb ataxia, flaccid penis, and bladder paralysis with urine overflow. The horse was resident in a private yard with other 4 in-contact horses, none of them showing clinical signs. All the in-contacts in the yard tested negative for virus isolation on both nasopharyngeal swab and heparinised blood. Paired serology in the affected horse showed stable high titres for both EHV-1 and EHV-4 whereas two in-contacts showed seroconversions to both EHV-1 and EHV-4 and the remaining two in-contacts showed stable low titres. The affected horse was taken to a vet practice before being diagnosed where it was in contact with a horse that tested negative on both nasopharyngeal swab and serology. No further cases were reported and restrictions were lifted after the affected horse tested negative for virus isolation on a nasopharyngeal swab.



EHV-3

One horse showed a seroconversion to EHV-3 on the virus neutralization (VN) test. No further information could be obtained regarding this case.

Two mares were diagnosed of Equine Coital Exantema (EHV-3 infection) by virus isolation on genital swabs. Both mares had clinical signs and tested positive on the VN test.

EHV-4 Respiratory infection

EHV-4 was isolated from a nasopharyngeal swab in a 4 year-old gelding which showed respiratory signs.

EHV-4 Abortion

EHV-4 was confirmed by PCR on placenta in a mare following abortion. No further information could be obtained regarding this case.

Equine Influenza

Three outbreaks of equine influenza were reported in this quarter.

Outbreak descriptions:

On 11th May 2010 equine influenza (EI) was confirmed as the cause of a large outbreak of respiratory disease on a single premises in Lincolnshire, England. The outbreak affected more than 180 non-vaccinated horses, ponies and donkeys of different breeds among 274 animals on the premises. Clinical signs were typical and very rapidly spreading and included pyrexia, nasal discharge and characteristic harsh, dry cough. Diagnosis was confirmed by the Animal Health Trust on the basis of positive nucleoprotein (NP) ELISA on multiple nasopharyngeal swabs. There was no policy for influenza vaccination on the premises and serology by haemagglutination inhibition (HI) in the positive cases showed that these horses were not vaccinated.

On 21st May 2010 equine influenza was diagnosed in a 13 year-old un-vaccinated horse in Shropshire, UK. Diagnosis was confirmed by the Animal Health Trust on the basis of positive nucleoprotein (NP) ELISA on a nasopharyngeal swab. The affected horse was resident in a private yard with 4 horses in total. Three horses were reported as affected; clinical signs included pyrexia, nasal discharge and cough. None of the horses in the yard had been vaccinated for EI in the past 4 years. The source of infection is still unknown; however there were no recent arrivals in the yard.

On 7th June 2010 equine influenza was diagnosed in three horses in a yard in Surrey, UK. Diagnosis was confirmed by the Animal Health Trust on the basis of positive nucleoprotein (NP) ELISA on a nasopharyngeal swab. There were 8 horses in the premises and most of them were affected; clinical signs included pyrexia, nasal discharge and cough. One of the positive cases was vaccinated for EI in February 2010 whereas the other two positives had never been vaccinated. The source of infection was believed to have been a horse that arrived to the yard a week before the onset of the outbreak; this horse was showing signs when it first arrived on the premises but the NP ELISA was negative when tested along with the other three positives.

Equine influenza virus characterisation

Genetic characterisation of the isolates obtained from the outbreaks in Lincolnshire, Shropshire and Surrey belonged to Florida sublineage clade 2 of the American lineage of H3N8 equine influenza virus.



Focus Article: Current and future approaches to EVA control

Richard Newton, BVSc, MSc, PhD, DLSHTM, DipECVPH, FRCVS, Animal Health Trust; in collaboration with Fatima Cruz, DVM, MRCVS, MPhil, Animal Health Trust.

Introduction:

Following the outbreak of Equine Viral Arteritis (EVA) reported in Ireland and Argentina in May 2010 and the recently reported outbreak in the UK in August 2010, the aim of this focus article is to give an overview on the epidemiological features of this disease and the current and new approaches to its prevention.

EVA epidemiology:

EVA can be transmitted either venereally from a stallion with infected semen through natural covering or artificial insemination (AI) or through the respiratory route through close contact between horses. After initial infection, most animals excrete virus in all bodily secretions, including semen, nasal and ocular discharges, urine and faeces for up to three weeks. After this time, the virus is cleared by the immune system, with the important exception of the accessory sex glands in stallions. The majority of infected stallions can shed the virus for 2-5 weeks (short-term shedders) or for many years (long-term shedders); approximately 30% of infected stallions are long-term shedders.

Shedding stallions and chilled semen are the most common ways that infection spreads long distances and across international borders; the recent outbreaks in Argentina, Ireland and the UK support this fact. In the UK it has been recognized that importation of shedding stallions (or their semen) poses the biggest risk of EVA. Although respiratory spread of EAV infection contributes to infectious transmission in some outbreaks, infected horses are usually only potentially infectious to other animals for several weeks and close contact is usually required.

The fact that EVA is subclinical (i.e. animals do not show obvious clinical signs) in a significant proportion of infections has led to the attitude in some quarters that the need for control of EVA is unnecessary and financially unjustified; however, subclinically infected horses are still able to transmit the infection to other animals with which they are in contact.

Current approaches to EVA control: the UK model

The annually updated Horserace Betting Levy Board Code of Practice (available online at <http://www.hblb.org.uk/>) continues to be the practical means by which prevention of EVA is implemented in the UK and some other parts of Europe, which is done particularly but not exclusively by the Thoroughbred breeding industry. This is based on annual pre-breeding serological screening of both stallions and mares and use of a killed vaccine (Artervac; Fort Dodge Animal Health) in stallions only.

In the event that EVA is confirmed, the Code of Practice recommends that the local Divisional Veterinary Manager of the Department for the Environment, Food and Rural Affairs (DEFRA) be immediately notified in accordance with The EVA Order 1995 (available online at http://www.opsi.gov.uk/si/si1995/Uksi_19951755_en_1.htm). In addition, all movements and breeding is stopped, all cases and contacts are traced, sampled and isolated and all other horses on the affected premises are screened and grouped according to infectious status. It is also important that good communication exists between interested parties including premises that have received animals (and semen if relevant) from the infected stud, those that are due to send animals and the breeder's association. Testing and screening should continue on all possible affected premises until the end of the outbreak, seropositive animals and pregnant mares should be isolated for four weeks after first sampling and stallions must have their shedding status investigated.

Current vaccination strategies in control of EVA:



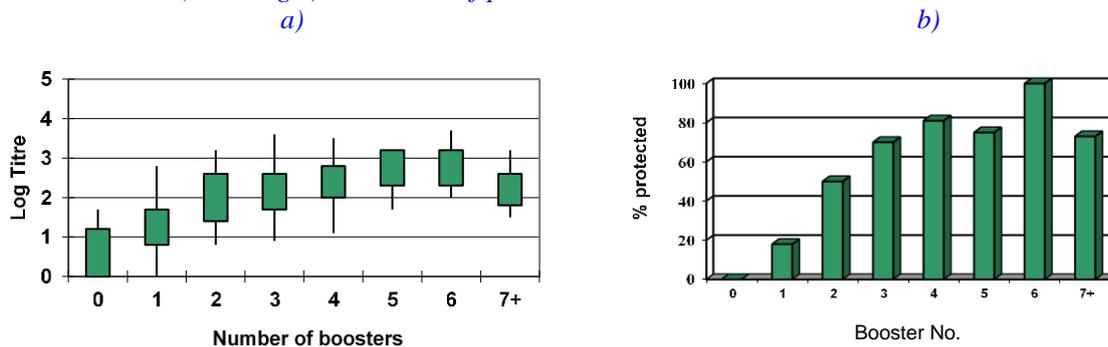
Vaccination strategies for EVA are based on use of formalin inactivated and live attenuated (also referred to as modified live) vaccines, with a geographical split in their use between Europe and Japan (inactivated) and North America (live attenuated).

Following the outbreak in the UK in 1993, a formalin inactivated vaccine (Artervac; Fort Dodge Animal Health) has been in use. In order to provide protection from the commercially devastating effects that long term EAV shedding would incur, vaccination has almost exclusively been restricted to breeding stallions, with the majority of Thoroughbred stallions receiving vaccine. The decision not to adopt EAV vaccination among breeding mares, in which the carrier state does not occur, in combination with requirements for routine pre-breeding serological screening has effectively provided a sentinel population in which on-going surveillance for new EVA subclinical infections can be conducted.

Future approaches regarding vaccination strategies in control of EVA:

Sero-surveillance of stallions vaccinated using Artervac conducted at the Animal Health Trust (J. Cardwell personal communication) demonstrates that to achieve and maintain levels of immunity required to protect against developing semen shedding, stallions require several boosters in addition to the two or three dose primary course (Figure 1). This indicates that many first season Thoroughbred sires are probably inadequately protected against EVA infection by use of killed vaccine. This could be overcome by vaccination and subsequent boosting of potential stallions whilst they are still racing.

Figure 1: EAV VN serological status of 108 stallions measured between 320 and 400 days after last vaccination using a killed virus vaccine: a) log₁₀ titre vs number of previous boosters and b) proportion with protective titres (>1.9 log₁₀) vs number of previous boosters



In the UK, the vaccine can be used in all horses and ponies over nine months of age. Veterinary surgeons and horse owners should be aware that the current datasheet requirement for the only inactivated EVA vaccine used in Europe presently is for **6 monthly boosters** and NOT 12 monthly (annual) boosters as was previously the case for this vaccine. This has been the case since April 2005, when the vaccine was granted a full licence by the Veterinary Medicines Directorate. Non-compliance with this booster interval requirement may necessitate investigation of the viral shedding status of stallions by Defra under the Equine Viral Arteritis Order 1995. It is important to note that vaccinated horses will become seropositive and this cannot be distinguished from true infection; therefore horses should be blood tested before vaccination to show that they are likely to be free of infection at the time of vaccination.

Some concern exists for both types of vaccines (formalin inactivated and live attenuated) regarding absence of their ready differentiation from natural infection and as such future marker vaccines based on a range of technology such as subunits, DNA or viral vectors would be useful, especially if they provided rapid onset and long lasting immunity.

Ideally, the model adopted by the Thoroughbred breeding industry in the UK and across Europe should be expanded to other breeds. However and unfortunately, it is only when outbreaks of clinically and financially significant EVA and constraints on national and international travel and trade occur that the attitude towards EVA control actually changes.



Bacteriology Disease Report for the Second Quarter 2010

A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 2. For contagious equine metritis (CEM) 24 of 28 HBLB approved laboratories in the UK contributed data.

VLA CEMO Data for the period April to June 2010

We are again pleased to include data relating to CEM testing from the Veterinary Laboratories Agency (VLA), in this quarterly report. The sample population for the VLA is different from that for the other contributing laboratories as the VLA tests are principally in relation to international trade and/or outbreak investigations.

Strangles

Strangles remains endemic in the UK, especially among parts of the non-Thoroughbred horse population. Diagnoses are confirmed in the UK based on traditional culture of *S. equi* and qPCR on respiratory samples and/or seroconversion using a serological ELISA.

Table 2: Diagnostic bacteriology sample throughput and positive results for the second quarter 2010

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
CEMO (HBLB)	7138	0	24
CEMO (VLA)	282	0	1
<i>Klebsiella pneumoniae</i> [#]	6813 ¹	8	24
<i>Pseudomonas aeruginosa</i>	6799 ¹	24	25
Strangles*culture	1984	95	18
Strangles PCR	1156	65	2
Strangles ELISA	1777	387	1
Salmonellosis	418	8	17
MRSA	195	3	9
<i>Clostridium perfringens</i>	143	9	7
<i>Clostridium difficile</i> (toxin by ELISA or immunochromatography)	145	20	7
<i>Borrelia</i> (by ELISA)	9	3	1
<i>Rhodococcus equi</i>	889	21	6
<i>Lawsonia intracellularis</i> **	11	0	3

CEMO = contagious equine metritis organism (*Taylorella equigenitalis*); HBLB = HBLB accredited laboratories; [#] =capsule type 1,2,5; VLA = VLA reference laboratory; **Streptococcus equi* subsp. *equi*; MRSA = methicillin resistant *Staphylococcus aureus*. ** *Lawsonia intracellularis* identified using PCR applied to faeces; ¹ reproductive tract samples only

Rhodococcus equi

R. equi is an important cause of disease and death in foals 3 weeks to 6 months worldwide. The most common clinical manifestation of this disease is pyogranulomatous pneumonia, and it has the potential to cause significant losses, especially on farms where it is enzootic. It is normally diagnosed by culture from a tracheobronchial aspirate, although a number of PCR techniques and serologic tests have been developed. Virulent strains of *R. equi* are characterized by their ability to survive and replicate within macrophages; this ability is associated with the presence of a large virulence plasmid of approximately 80 to 90 kilobases (kb). All the contributing laboratories that reported data in this quarter diagnosed *R. equi* by culture and/or PCR.



VLA *Salmonella* results

From the 6 strains typed by the VLA the serotypes reported were *S. Typhimurium* (two cases), *S. Derby* (two cases) and *S. Newport* (one case). The sixth strain was included in serogroup B but could not be typed. Each of the 6 positive samples represents one incident.

The following definition of an incident applies: “An incident comprises the first isolation and all subsequent isolations of the same serovar or serovar and phage/definitive type combination of a particular *Salmonella* from an animal, group of animals or their environment on a single premises, within a defined time period (usually 30 days).”

For more information from Defra about *Salmonella* in the UK, please [click here](#).



Focus article: Contagious Equine Metritis (CEM) in non-Thoroughbreds in mainland Europe

Dr. Hanspeter Meier, FVH, ECEIM, Vetsuisse Faculty, University of Berne, Switzerland.

It is generally agreed that CEM has been eradicated from the Thoroughbred horse worldwide, but is considered to be endemic in other populations in mainland Europe.

In view of this problem, a first international conference on CEM was held in Lelystad (2007). The aim of the conference was to highlight the problems that *Taylorella equigenitalis* can cause to international trade, to discuss new diagnostic methods and the occurrence of *T.asinigenitalis*. The organizers were Peter Heath (VLA, UK) and Hendrik-Jan Roest (CIADC, NL).

According to Ricketts (2007), already 30 years ago it became clear that a carrier state occurred in stallions, teasers and mares and that this was an important mode of transmission. Moreover, lateral spread of infection occurred through veterinary examinations and during teasing of mares. He also pointed out that infected mares often developed an endometritis with a copious vaginal discharge. Nowadays the infection appears to be largely asymptomatic (Ricketts 2007).

All these findings are still valid and important, but today's generations of breeders seemingly are not familiar enough with CEM any more. However, the number of cases, too often only detected in importing countries with a high standard of equine medicine, lets us assume that more carrier mares exist than generally expected.

In Lelystad, both Timoney (2007a) and Devenish (2007) summarized their experience with international trade and technology development in diagnostics. Much of the trade has involved high-priced warmblood stallions and mares. Therefore, Germany was one of the most important trading-partners, both because of the quality and numbers of its stock. According to Boese et al. (2007), German breeding practices rely largely on artificial insemination (AI). For licensing of AI stallions an annual testing for CEM is required, and during the period from 2001-2006, CEM has officially been reported on 6-12 premises per year, with about half of the cases reported on AI stallion studs.

Information on cases in mainland Europe came, among others, from Austria [stallions at the Spanish Riding School (SRS) in Vienna]. Late in 2006, a 3 year-old stallion tested positive in the screen required for export. The following triple screening (PCR and culture method) of all 68 stallions at the SRS revealed 48 (71%) positive results. All Lipizzaner horses at the Federal Stud in Piber were also tested. All 6 stallions used at the stud were negative. While all yearling colts were also negative, 44% of the 50 two-, three- and four-year old colts and stallions and 5 geldings tested positive. *T.equigenitalis* was also detected in 8 non-breeding mares and 2 of the 50 broodmares. Most mares are bred by AI and no clinical signs were observed.

The origin of the infection was not known and *T.equigenitalis* seems to have been endemic in both Vienna and Piber. Transmission appears to have taken place mostly in the stallion groups through direct contact or contamination (Burger and Dobretsberger 2007).

At the International Breeders' Meeting 2008, detailed information was also available from Switzerland, where clinical cases of CEM occurred in 1988 and 1989. In some cases, a connection to imports was evident. Further, in 1994, 1997, 1998 and 1999, routine swabs of three stallions from the Netherlands (1) and Germany (2) and an Accal Tekkenian showed the presence of *T. equigenitalis*. In 2007, a positive swab from a prospective warmblood-stallion from Germany was found on the occasion of a purchase examination. Beside these typical cases of CEM, the original Swiss breed (Freiberger or Franches-Montagnes), was also found to harbour the CEMO. In a routine screening in 2006, a total of six stallions from the Swiss National Stud tested positive by culture and PCR. All six stallions (2 Warmblood and 4 Franches-Montagnes) were taking part in a research project, and all had tested negative end of July 2005, at the end of the breeding season. In 2006, 2007 and 2008, more male Freiberger tested positive on swabs.



A further limited outbreak was reported in 2008, affecting four non-TB breeding animals on two premises. A Lipizzaner-stallion imported in May 2007 from Hungary had to be examined to be approved for breeding. Other male horses at the same stable were tested too, as it was standard practice at this premises to move horses from box to box while mucking out. A colt and a recently castrated gelding tested positive too. These horses had contact with animals (Pura Raza Espanola) from a neighbouring stable in both the same and an adjoining paddock, among them three entire males, a stallion (9 year-old) and two horses (10 year-old and 5 year-old). The younger horse was also positive.

In 2009, a Poitou-donkey was examined before semen collection and this jack was affected with *T.asinigenitalis* (Meier 2008).

Taylorella asinigenitalis

At the conference in Holland, Timoney (2007b) also mentioned *T. asinigenitalis*. In late 1997 and early 1998, a previously undescribed bacterium, closely resembling *T.equigenitalis*, was isolated from the semen of a mammoth and the reproductive tract of 2 donkey jacks, a horse stallion and 7 mares, respectively.

Isolations of the bacterium have since been recorded from Sweden and France too. In Sweden, *T.asinigenitalis* has been isolated from the genital tract of a stallion with a natural infection (Baverud and Johansson 2007). This 3 year-old stallion of the Ardennes breed had been imported from the continent and was routinely tested for CEM.

So far, too little is known about the distribution, pathogenesis and clinical impact of *T.asinigenitalis* in equidae. To prevent uncontrolled spread of this germ worldwide, Roest (2007) suggests to handle *T.asinigenitalis* infections equally as *T.equigenitalis* infections.

Surveillance

Summarizing these findings, one gets the impression that CEM can be detected in just about any country and breed in mainland Europe, as long as the horses are examined. This assumption brings us to the delicate subject of surveillance which still poses problems both in human and veterinary medicine. Financial constraints can be a hindrance even in human medicine, as a study from Malani and Laxminarayan (2006) shows. These authors explored the incentives of countries to invest in disease surveillance. They evaluated policy instruments available to encourage countries to detect and report disease outbreaks, including medical assistance to control outbreaks, trade sanctions for non-reporting and assistance in disease surveillance. With respect to WHO policy levers, they found that punitive sanctions may have limited effects against countries that are too poor to suffer any further (Malani and Laxminarayan 2006).

Encouragement for reporting seems to be the best way forward, but to my knowledge, in the equine industry of mainland Europe, almost no financial and even moral support exists. Preventive medicine obviously doesn't earn recognition, probably for the reason that one notices these efforts least when they are carried out best. In the same context, a distinct publication bias may occur. However, the lack of political assistance may also be due to the fact that the popularity of equine sports in public is modest - and seems to get even poorer. Finally, one has to bear in mind that the control of infectious diseases has to embrace the whole population, as such problems develop mainly in less privileged communities.

New diagnostic methods

Both Ricketts (2007) and Timoney (2007) mentioned that CEM has become endemic in the non-Thoroughbred horse population of many mainland European countries due to not implementing screening, treatment and preventive measures.

Nowadays however, PCR tests have been developed internationally and more widespread use of well validated nucleic acid base diagnostic technologies should facilitate detection of the carrier state, especially in the stallion, and mitigate the risk of dissemination of CEM through international trade (Anzai 2007, Boese et al. 2007; Devenish et al. 2007; Ousey et al. (2009); Ricketts 2007; Timoney 2007; Wakeley 2007). All this work is very promising for significant progress in our battle for fighting CEM - if the means are used, of course. These new possibilities let us wonder whether it might be worthwhile to screen semen and breeding stock in mainland Europe.



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Toxic and Parasitic Disease Report for the Second Quarter 2010

A summary of diagnostic toxicosis and parasitology testing undertaken by contributing laboratories is presented in Tables 3 and 4 respectively. Results for toxicosis are based on histopathologically confirmed evidence of disease only (where applicable).

Table 3: Diagnostic toxicosis sample throughput and positive results for the second quarter 2010

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
Grass Sickness	35	19	5
Hepatic toxicoses	14	2	4
Atypical myopathy	5	4	2
Tetanus	0	0	0

Table 4: Diagnostic parasitology sample throughput and positive results for the second quarter 2010

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
<u>Endoparasites</u>			
Ascarids	1813	21	12
Cyathostomes	1392	294	11
Dictyocaulus	872	4	8
Strongyles	2503	464	17
Tapeworms (ELISA based testing)	14	13	4
Tapeworms (Faecal exam)	1917	8	10
Trichostrongylus	54	6	1
Strongyloides	876	35	11
<i>Oxyuris equi</i>	415	3	4
Fasciola	123	8	2
Coccidia	183	1	2
Cryptosporidia	4	1	2
VLA <i>Theileria equi</i> (CFT)*	141	9	1
VLA <i>Theileria equi</i> (IFAT)**	282	22	1
VLA <i>Theileria equi</i> (cELISA)***	104	2	1
VLA <i>Babesia caballi</i> (CFT)*	141	0	1
VLA <i>Babesia caballi</i> (IFAT)**	271	14	1
VLA <i>Babesia caballi</i> (cELISA)***	104	2	1
<u>Ectoparasites</u>			
Mites	16	1	1
Lice	472	19	12
Ringworm	543	98	15
Dermatophilus	271	16	9
Candida	56	2	2

*Complement Fixation Test; CFT suspect/positive samples are tested in IFAT test

Indirect Fluorescent Antibody Test; *competitive Enzyme-linked immunosorbent assay; positive cELISA results are not undergoing confirmatory testing



Grass sickness surveillance data (www.equinegrasssickness.co.uk):

A total of fifty equine grass sickness cases have been reported for the second quarter (April to June 2010), making a total of fifty-eight reports in 2010. The type of grass sickness was reported for forty-three cases with twenty-nine (67.4%) acute cases, four (9.3%) subacute cases and ten (23.3%) chronic cases. Three horses died naturally, thirty-six cases were euthanased and four chronic cases have survived to date. Ten cases underwent surgery and were diagnosed by biopsy examination, five cases were diagnosed by post-mortem examination and twelve cases were diagnosed by both post-mortem and ganglia/biopsy examination; the rest of the cases were diagnosed based on clinical signs alone.

The location of six cases was not disclosed, with thirty-four cases reported from England and ten from Scotland.

Of the affected horses 53% were geldings, 41% were mares and 6% were stallions. A range of ages was reported (1 year to 29 years) with the mean age being 8.1 years and the median 6 years. The breed type of forty-nine cases was provided with 35% of the cases being crossbreeds and 65% being purebreds.

It should be noted that the grass sickness surveillance scheme receives data from a wider population in comparison to the data presented in Table 3 and different diagnostic criteria were used. For more information about the grass sickness surveillance please refer to previous reports published in Vol.4 No.2 and Vol.2 No.4.



Report on Post-mortem Examinations for the Second Quarter 2010

East Anglia

A total of 87 cases were examined including 26 aborted fetuses.

Of the aborted fetuses examined this quarter, placentitis was suspected as the precipitating cause in 7 of 26 cases. EHV-1 was confirmed by PCR, virus isolation and histopathology in 8 fetuses whereas EHV-4 was confirmed by PCR and histopathology in 2 cases. No definitive cause was determined for 9 cases of abortion, however infectious agents were excluded and the most likely cause was placental insufficiency.

There were seventeen cases of neonatal death reported in this quarter. Five of these cases were associated to dystocia whereas one case was diagnosed to be due to neonatal encephalopathy and two cases were due to sepsis one of which was caused by *Streptococcus spp.* EHV-1 was confirmed by PCR, virus isolation and histopathology in 2 newborn foals that died within 24 hours. No definitive cause was determined for the remaining 7 cases, however infectious agents were excluded.

A 17 year-old mare was euthanased after showing neurological signs for 48 hours. The signs included hyperaesthesia, head tilt, muscle tremors, circling, and some aggression; encephalitis was suspected. Post-mortem examination revealed focal haemorrhages within the lower cervical and cranial thoracic spinal cord. In addition, the brain had regions exhibiting a multifocal, non-suppurative, predominantly lymphocytic meningo-encephalitis. The spinal cord was only minimally affected and histology showed vasculitis (compatible with Herpesvirus myelopathy). The horse also presented an unusual, severe focus of deep ulceration in the rostral hard palate, with an associated local neutrophilic vasculitis and thrombosis in the immediately underlying connective tissues. EHV was excluded by PCR and virus isolation in a variety of tissues including CNS. In addition, paraffin blocks containing cerebrum, cerebellum and spinal cord were sent to the AGES Institute in Austria where immunohistochemistry screening for West Nile Virus (WNV) was carried out; the results were negative. Whilst EHV and WNV infections were included, an aetiologic diagnosis was not possible and a lympho-proliferative, immune-mediated condition was suggested. There remains the possibility that some of the clinical signs showed by the mare were associated with the unusual and rather aggressive hard palate lesion.

Twelve horses were examined following gastrointestinal disease, causes of death were as follows: Seven cases of Equine Grass Sickness (three of them lived in the same field), one case presenting a duodenum rupture and haemoabdomen, one case of peracute small intestine volvulus, one case presenting a mesenteric volvulus involving jejunum, one case of caecal rupture following acute colitis, and finally one horse presenting a diaphragmatic hernia.

There were four respiratory cases reported. Following post-mortem examination and histology two cases were diagnosed with a thrombo-embolus. The remaining two cases were diagnosed with *Rhodococcus equi* infection; one of them presented abscessation in the lungs and mediastinal lymph nodes.

Post mortem examination and histology of a horse that had a sudden death revealed abdominal aortic rupture leading to a severe retroperitoneal haemorrhage.



One case of neoplasia in a horse was reported in this quarter. Post-mortem examination and histology showed a tonsillar squamous cell carcinoma in this case.

The seventeen musculoskeletal cases reported in this quarter include a comminuted first phalanx (PI) fracture, three cases of atypical myopathy diagnosed by histology, a case of comminuted fracture at the base of the skull leading to intracranial haemorrhage, two cases euthanased due to severe laminitis and ten cases in which it was not possible to establish a diagnosis.

Four cases with hepatic disease were diagnosed of ragwort poisoning following histopathology and/or post-mortem examination. One of these cases was the only welfare/neglect case reported in this quarter and also showed *Strongylus vulgaris* infestation with inflammatory changes of infested arteries, thrombosis and aortic aneurysm.

Other cases reported include two horses in which post-mortem examination suggested an anaphylactic shock and two cases in which the cause of death could not be confirmed.

Home Counties

Eighteen cases were examined in this quarter.

Three abortions were reported in this quarter. One of them was confirmed by histopathology to be due to EHV-1 whereas in the remaining two a cause could not be diagnosed.

The five neurological cases reported in this quarter include single cases of Equine motoneurone disease, granulomatous meningoencephalomyelitis, non-suppurative meningoencephalitis, vertebral stenotic neuropathy and a fracture following head trauma.

Four cases of colic disease were reported, in one of them post-mortem examination revealed a volvulus as the cause of colic.

In a horse with cardiac disease post-mortem examination and histology showed myocardial necrosis.

Neoplasia cases include a horse that presented an adrenal cortical tumor and an ethmoid haematoma, a case of disseminated melanoma, a case of leiomyosarcoma in the gastrointestinal (GI) tract and a pituitary gland tumour.

The last case reported in this quarter was a welfare/neglect case showing bilateral keratitis and blindness.

South West

Nine cases were examined in this quarter.

Three neurological cases were reported in this quarter. Following post-mortem examination in the first case a pituitary adenoma of the pars intermedia was confirmed. In the second case post-mortem examination revealed a hydatid cyst in the right cerebrum ([please see below a more extended report on this case](#)). The cause of death in the third case could not be determined.

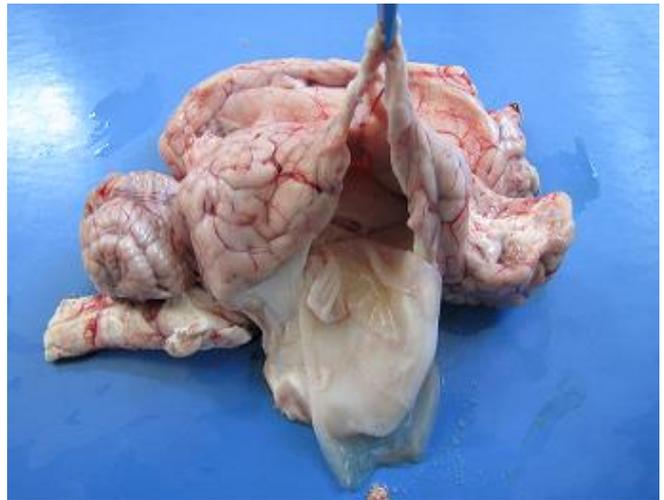


Hydatidosis in a donkey with neurological signs

A 15 year old female donkey at The Donkey Sanctuary in Devon was presented for progressive neurological signs of 6 months duration consisting of circling, aimless wandering, sham eating and drinking, and isolation from the other donkeys.

A neurological examination, including cranial nerves and proprioception was normal, but the donkey was dull. Due to the long duration of clinical signs and poor prognosis the donkey was euthanized on welfare grounds.

At post mortem examination there was a large 8 x 4 x 4 cm clear 1 - 2 mm thick hydatid cyst in the right cerebrum causing compression/ atrophy of approximately 80 % of the affected hemisphere. The cyst contained clear fluid with many small pinpoint granules. Histopathology identified a large cavity lined by epithelioid cells including macrophages and multinucleate giant cells, with a number of protoscolices of *Echinococcus sp.* within the cavity.



Hydatid cyst within the right cerebrum

Horses and donkeys are the intermediate hosts for *Echinococcus granulosus equinus*; the domestic dog and the red fox are the final hosts. Equine hydatidosis is commonest in Europe, and in other parts of the world most cases have been recorded in imported European horses.

Acknowledgements: We would like to acknowledge Dr. Nicole du Toit, veterinary pathologist at The Donkey Sanctuary in Devon for this report and the picture in it.

In a 2 month-old orphan foal post-mortem examination and histopathology showed gastric ulceration associated with bacterial rods.

Two cases were examined following musculoskeletal disease. In one of them atypical myopathy was confirmed whereas the remaining case showed a severe hip osteoarthritis.

In a donkey with hepatic disease gross post-mortem examination revealed a fibrotic liver.

Other cases reported include a case of panniculitis with necrosis and thrombosis which was associated with a skin wound and an aged, semi-wild Quantock Pony that showed ectoparasitism due to *Damalinia equi* and endoparasitism due to *Gasterophilus sp.*, *Anoplocephala perfoliata* and cyathostomiasis. Other findings in this case were mild to moderate enterocolitis, an adrenal cortical adenoma with nodular hyperplasia and a wave mouth, sharp enamel points, gum recession and hyperplasia.



Northern England

Two cases were examined in this quarter.

One case of abortion and one case of neonatal death were reported this quarter. Following post-mortem examination the abortion was found to be due to twins, whereas the neonatal death was associated to dystocia.

West Midlands

One case was examined in this quarter.

Post-mortem examination in one case with respiratory signs revealed a ruptured diaphragm.

Scotland

22 post-mortem examinations were reported in this quarter.

A twelve year old Arab mare was presented to the equine hospital with a history of recurrent oesophageal obstruction. A firm swelling was present within the mid cervical region of the oesophagus, and endoscopy revealed mucosal ulceration within this area, and also multiple mucosal papillomatous growths within the proximal oesophagus. At necropsy examination a 17cm long section of the mid cervical oesophagus was circumferentially firmly enlarged and thickened, with marked mucosal ulceration. Proximally and distally to this region were areas of mildly thickened mucosa and multiple discreet papilliform mucosal structures. The squamous gastric mucosa contained two well demarcated regions of mucosal ulceration. A preliminary diagnosis of primary oesophageal squamous cell carcinoma was later confirmed by histopathology.

Equine dysautonomia was diagnosed in two cases following gross post-mortem examination.

A twelve year old thoroughbred cross mare was presented for necropsy with a history of epistaxis and poor bodily condition. Gross necropsy findings included multiple firm, well demarcated cream to white nodules and coalescing masses scattered throughout the caudal lung lobes, haemopericardium, nasal and turbinate haemorrhages, bilateral maxillary sinusitis, and moderate dental disease. In addition the liver contained multiple cystic lesions which on section were finely lobulated and contained clear serous fluid with a small amount of finely granular material (hydatid cysts). Histopathology of the pulmonary lesions revealed multifocal to coalescing regions of parenchymal fibrosis with moderate numbers of alveolar inflammatory cells, and a diagnosis of Equine Multinodular Pulmonary Fibrosis was made.

A nine year old Irish sports horse presented to the equine hospital with a bilateral jugular distension, generalised oedema and pleural effusion. Gross necropsy examination was performed and revealed enlargement of multiple lymph nodes including submandibular, retropharyngeal, tracheobronchial, renal and splenic nodes, and sublumbar nodes, and the pharyngeal tonsils. The cranial mediastinum was filled by a multilobulated firm, pale yellow mass. Both kidneys contained multifocal cortical nodules which were white, well demarcated and bulged slightly from the cut surface. Histopathology confirmed a diagnosis of lymphoma, which was considered to be consistent with either a thymic or multicentric pattern.



A six year old Welsh pony presented with a history of exercise intolerance, atrial fibrillation and tachycardia. Cardiac ultrasonography suggested a ventricular septal defect and the pony was euthanased. Gross necropsy revealed an enlarged flaccid heart, with an enlarged left atrium, and a large ventricular septal defect with only a small amount of septal wall remaining. The septal portion of the right atrioventricular valve attached to a hypertrophied papillary muscle within the left ventricle. There was supraventricular dilatation of the pulmonary artery, and the epicardial surface of the left atria appendage was dull, roughened and adhered to the adjacent pulmonary artery. The liver was markedly congested with a mottled brown and white appearance on cut section. Histological examination of the liver revealed extensive bands of porto-portal bridging fibrosis with congestion and bile duct proliferation. These changes were attributed to chronic passive congestion as a result of the cardiac abnormalities.

In one case with respiratory signs, gross post-mortem examination revealed a nasal polyp.

Other necropsy cases included three cases of trauma, one case of post foaling endometritis with subsequent gastric rupture, two aborted/still born foals with no significant abnormalities, one day old Clydesdale foal with marked arthrogryposis, one horse with multiple degenerative joint disease, one case of heart failure, a tendon injury, a case of guttural pouch mycosis and haemorrhage and four open diagnoses.

Biopsies from 20 horses were submitted this quarter.

Surgical or post mortem biopsy samples were submitted from 20 horses. Six muscle biopsies were examined, two of which were within normal limits. Two were polysaccharide storage myopathy, and one was consistent with equine motor neurone disease. One sample was considered to be inconclusive. Diagnoses from other samples included three cases of grass sickness, an ovarian granulosa theca cell tumour, one idiopathic jejunal haemorrhage (within the tunica muscularis), one respiratory sinus cyst, one case of meningo-encephalitis, a cutaneous fibroma, one case of non specific ileitis, and two cases of equine sarcoids. No diagnosis was determined in the remaining three biopsies.

Northern Ireland

Fifteen post-mortem examinations including three aborted fetuses were examined in this quarter.

Streptococcus zooepidemicus was isolated from a donkey foal that was aborted near term. No other pathogens were identified. Two other aborted fetuses were examined; unfortunately the causes of these abortions could not be determined.

A seven year-old gelding was found dead in a field. On post-mortem examination the pericardial sac was distended by copious blood-stained fluid. The heart was pale with a 5 mm. diameter vegetative mass on the medial cusp of the left atrio-ventricular valve. On histopathological examination there were foci of myocardial fibre degeneration associated with mild to moderate infiltrations of neutrophils.

An eleven year-old stallion had a history of conjunctivitis and a lump on the right side of the neck. The horse subsequently developed neurological signs (circling, hyperaesthesia



and kicking) and was euthanased following recumbency. Serology for EVA was negative. On post-mortem examination there were multiple lymphatic nodules throughout the connective tissue of neck and chest wall. On histological examination diffuse foci of perivascular lymphocytic cuffing were seen in the cerebrum and cerebellum. The lymphatic nodules contained a mixed population of lymphocytes including many large cells with a low mitotic index. There was an infiltration of surrounding connective tissue with lymphocytes. The brain lesions were indicative of encephalitis, probably of viral origin, and possibly due to Herpesvirus infection. The histological features of the lymph nodes were suggestive of multicentric lymphosarcoma, but it is unlikely that this condition was sufficiently advanced to be of clinical significance.

A one week-old foal died suddenly after acute diarrhea. On post-mortem examination the caecum and colon had yellow, watery fibrinous contents. Patchy serosal and mucosal congestion were also seen. Scanty yellow fluid and mucoid contents were present in the small intestine. The mesenteric lymph nodes were enlarged. Large numbers of cryptosporidia were present in the caecal contents. No other significant pathogens were identified.

Cyathostomiasis was present at three post-mortem examinations. A two year-old gelding was found dead at grass. A caecal intususception was present. On post-mortem examination blood-stained fluid was seen in the caecum and peritoneal cavity. Large numbers of cyathostomes were identified in the caecum. A three year-old mare was euthanased after a history of diarrhea and chronic weight loss. On histological examination severe cyathostomiasis with multiple worm profiles was present in the mucosal and submucosal layers of the colon. Widespread granulomatous inflammation and lymphoid infiltrates were also present. A three year-old stallion was found dead. On post-mortem examination the caecum and colon were distended with watery contents. Large numbers of cyathostomes were present.

A sixteen year-old mare developed a low grade chronic colic and weight loss after foaling. The mare was euthanased six weeks after foaling. On post-mortem examination approximately twenty litres of straw-coloured peritoneal fluid was present. Diffuse fibrinous peritonitis, with fibrin tags on diaphragm, liver and intestinal serosa, was also seen. Congestion and oedema were present in the uterine mucosa.

Following castration approximately three weeks previously, dramatic weight loss was noted in a yearling gelding. Clinical signs included slow swallowing, reluctance to drink, ptosis of eyelids, snuffling upper airways and pyrexia. The animal was treated with penicillin and phenylbutazone, but was euthanased following further deterioration. On post-mortem examination the yearling was dehydrated and in poor condition. Multifocal shallow ulcers were seen in the stomach.

A four day-old foal died after showing neurological signs. On post-mortem examination pulmonary atelectasis was present. *Staphylococcus aureus* was isolated in septicemic pattern from the viscera.

A foal, which lived for twelve hours before showing clinical signs of diarrhea, was examined post-mortem. Pale pink liquid contents were present in the small and large intestines. There was no evidence of sucking. Tests for the presence of EHV and *Leptospira* were negative and histological examination showed only mild degenerative changes in the liver and kidney. *Clostridium perfringens* was recovered in mixed growth



from the alimentary tract and in pure growth from the liver, kidney and spleen. Examination for *Clostridium perfringens* type A toxins was positive.

A six week-old foal died suddenly after having been dull for a few days. On post-mortem examination the colon was impacted with semi-solid contents. 21,300 Strongyloides worms were present in the small intestine.

A six week-old foal died suddenly at grass. On post-mortem examination a navel ill was present. *Staphylococcus aureus* was isolated from the navel. 38,200 Strongyloides worms were present in the small intestine.



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**We would welcome feedback including contributions on focus articles
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